Cromer Museum
Brief History
Guide no: 17
£1.25p

The West Runton Elephant

Steppe Mammoth *Mammuthus trogontherii*

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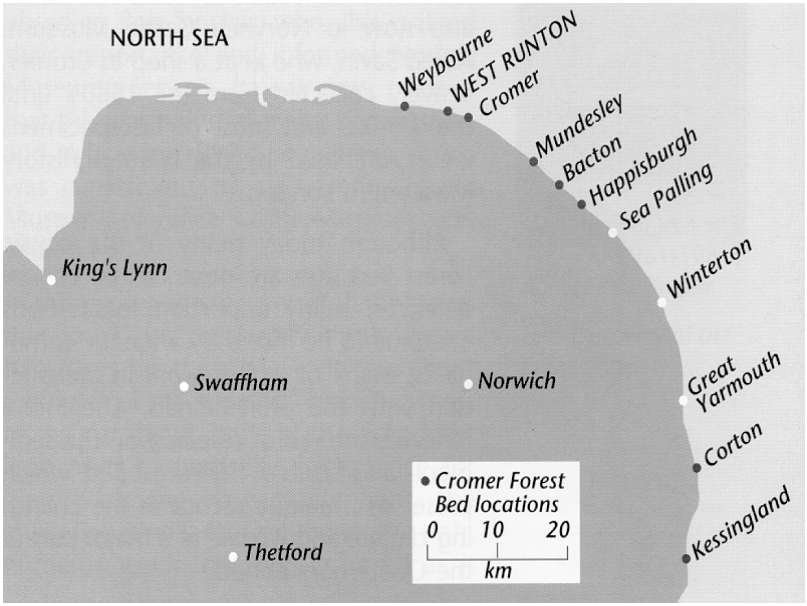


The West Runton Freshwater Bed is the dark band at the bottom of the cliffs

Discovery

The story begins on 13 December 1990 when, following a stormy night, local residents Harold and Margaret Hems took a walk on the beach. They found a large bone partly exposed at the bottom of the cliffs, and contacted Norfolk Museums Service. It was identified as a pelvic bone of a large elephant. Just over a year later after another storm, several more huge bones were uncovered. This was obviously a find of major significance, and in January 1992 the first exploratory excavation took place. Once the results of this had been evaluated, a second major 3 month excavation followed in 1995.

Background

The "West Runton Freshwater Bed" is a five-foot thick layer of organic-rich mud deposited by a medium sized river about six hundred thousand (600,000) to seven hundred thousand years ago, long before the last ice age. This deposit, just east of West Runton on the North Norfolk coast, is full of all sorts of fossils. These range from thousands of small snail shells, twigs and small mammal bones, through medium sized deer, horse and rhino bones to the huge bones of elephants that roamed our country in herds back then. There have been many species of elephant living in England over the last few millions of years. The West Runton Elephant, living when the Freshwater Bed was laid down, was the Steppe Mammoth *Mammuthus trogontherii*.

This was the largest species of elephant that has ever lived, and the largest animal ever to have lived on land except for the very biggest dinosaurs. Standing four metres high at its shoulder, it would have weighed about ten tons – twice the weight of any male African elephant you would find today. It is the largest elephant skeleton ever found and is the oldest elephant skeleton to have been found in the UK (some individual bones or teeth from elsewhere are older, but none make even a partial skeleton). The West Runton Elephant skeleton is also the best example of this species ever to have been found. Previously the best were two partial skeletons, one in

Germany and the other in Russia, both only about 10-15% complete. The WRE skeleton is about 85% complete.

Because the West Runton Freshwater Bed is the "type site" for the Cromerian Interglacial it is the benchmark that all other countries in Europe use when studying their own deposits of a similar age. That is why when the first bones of the elephant were discovered after storms in the winters of 1990 and 1992, the Norfolk Museums and Archaeology Service applied for funding to excavate the site more fully to unearth the rest of what this very important find. It was clearly also a good chance to study other aspects of the site in more detail. To find such a complete skeleton during the 1995 excavation, so well preserved and with so many other bones, was a very welcome surprise.

Excavations

The remaining skeleton was excavated over a three-month period by staff of the Norfolk Archaeological Unit, who paid meticulous attention to every detail when recording the remains of other fossils in the deposit. Not only were all of the bones carefully drawn and plotted on maps (using a laser-based theodolite) but specialists from all around the country and abroad came to collect pollen, macroflora, microfauna and sediments. They studied all aspects of the stratigraphy, mineralogy and chemistry of the site. Ten tonnes of soil were carefully removed, a trowel-full at a time, to be sieved for the tiny bones of frogs, newts, lizards, snakes and small mammals and birds.

On page eight you can find a list of all the animals that were found. Many of them are now extinct - but some, like rhinos, hyaenas, wolves and bears, sound exotic. Many people ask "was the climate much warmer back then?" The answer is "no", The climate was identical to what we have now. We know this from all the pollen studied and other clues such as the presence of amphibians, snails and small mammals that can only live within a narrow range of temperatures. The animals appear exotic to us now because since the time of the

West Runton Elephant we have suffered the effects of several ice ages that have reduced species diversity, followed by a rise in sea levels making Britain an island and creating a barrier to animals that might have re-colonised our land from Europe. Then mankind arrived in Britain about 500,000 years ago and hunted some species to extinction.

It is rare for animals to be buried in conditions that are just right for fossilisation. The millions of fossils in museums all around the world are but a tiny fraction of all the species that have ever lived. Even when an animal is buried in the right conditions it takes millions of years for the material to truly fossilise – to "turn to stone". A buried bone can retain organic material (like collagen, giving it some strength and flexibility and maybe some DNA!) for up to forty thousand years. But the elephant remains are about *600,000 - 700,000* years old. Therefore the West Runton Elephant and all the other bones found with it are what we call "sub-fossil". Old enough to have lost their strength and flexibility, but too young to be strengthened by the fossilisation process. They are simply the brittle mineral matrix of bone, and surprisingly fragile. Unfortunately, they are also very big and heavy. Each femur is 1.5 metres long, and all the main limb bones are close in size to those of large saurapod dinosaurs. Because of this fragility and weight, the bones needed support when they were uncovered during the excavation. They were carefully wrapped in tissue paper and foil, before being encased in plaster of Paris, and stiffened by large splints. On the last day of the dig the well-preserved skull and tusk were lifted out from the bed by crane, in a specially made supporting cradle. Then the hole was filled back in. All the bones and the tusks were put on pallets and taken from the site by lorry to the conservation laboratory at Gressenhall, Norfolk.

Conservation

In the laboratory, the protective plaster jackets were carefully removed, piece by piece. The sediment and soil was removed with brushes, small dental

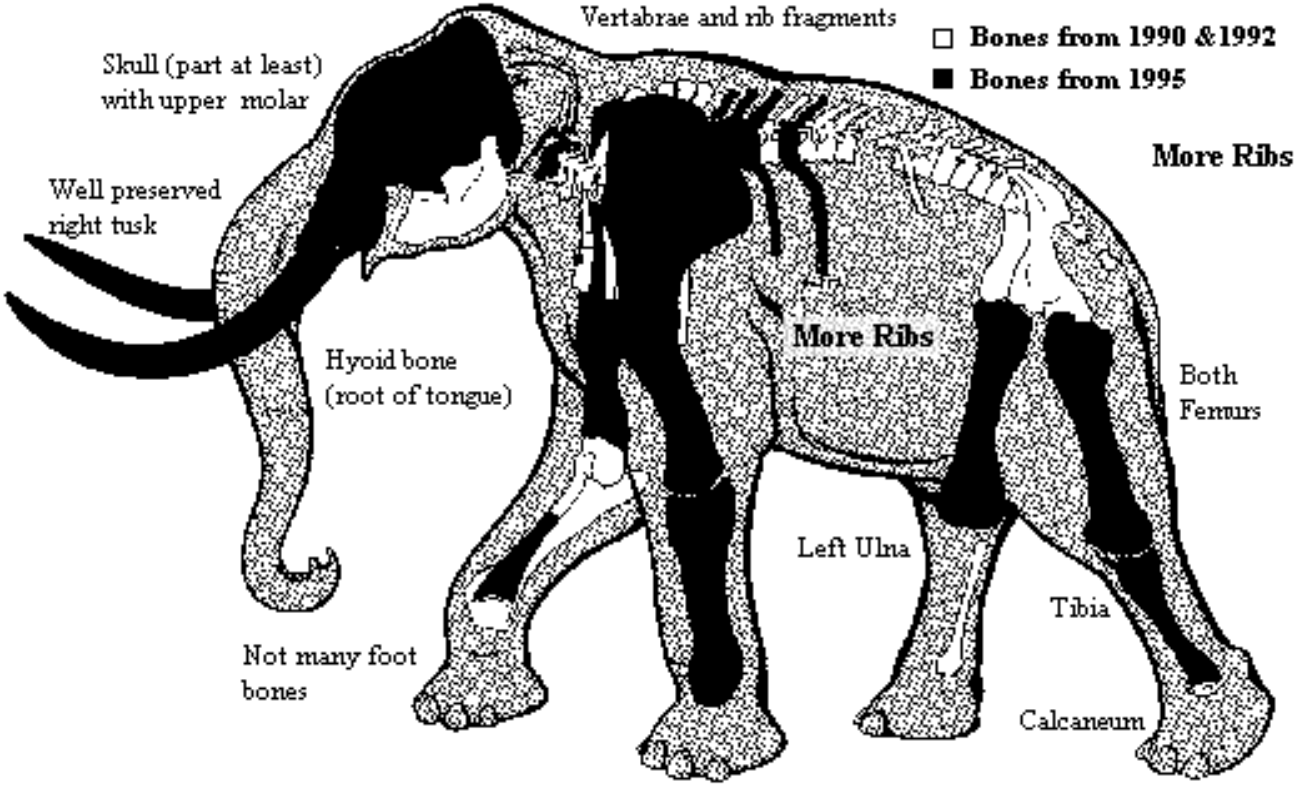
tools, pins, scalpels and fine jets of high-pressure air containing slightly abrasive powder. All this work was done under a microscope (even the biggest bones) to ensure we would not damage the surfaces of the bones. During the cleaning process the fine details became clear - such as the tooth-marks and droppings of the spotted hyaenas that were scavenging from the elephant carcass. We kept a photographic record as we worked and made copious notes. We could soon tell how old the elephant was when it prematurely died, and, as the interesting pathology of the diseased and deformed right knee area slowly revealed itself, the reason why became clear.

Cataloguing

After all the bones were cleaned, and repaired where necessary, they were described and catalogued. Small bones were then stored in trays or boxes of archival quality (i.e. they will last for many decades, and do not contain harmful chemicals), in specially cut nests in archival foam. The larger bones posed a problem. Being so big (up to 1.5m long) and so heavy (most need two people to move them) but also very weak (because they are only sub-fossil bone) they could easily be damaged by poor handling. To solve the problem permanent, rigid jackets were made for them to lie in. A soft archival foam layer is placed closest to the bone, with a rigid resin jacket supporting it beneath. When a bone is to be moved, or turned over, another jacket is bolted to the upper surface, the bone moved or turned, and the uppermost jacket taken off again. The heaviest bones are stored on trolleys.

Storage

All the bones are stored in a climate-controlled environment. If the temperature or humidity levels varied greatly the specimens would react by expanding and contracting slightly. If this occurred more than a few times the material would begin to break down physically, and the elephant material would be irreversibly damaged. Had we been able to


Vertabrae and rib fragments
Bones from 1990 &1992
Bones from 1995
Skull (part at least)
with upper molar
More Ribs
Well preserved
right tusk
More Ribs
Hyoid bone
(root of tongue)
Both
Femurs
Left Ulna
Tibia
Not many foot
bones
Calcaneum

leave the elephant in the ground for another fifty million years, it might be well fossilised and less vulnerable! But had we left it there at West Runton the sea would have destroyed it within just a decade.

Mammals found in the West Runton Forest Bed

Extinct Worldwide	Extinct in the UK	Still present in the U.K.
Mammuthus trogontherii (steppe-mammoth - the West Runton Elephant), *Sorex savini* and *Sorex runtonensis* (shrews), *Talpa minor* (extinct mole), *Trogontherium cuvieri* (giant beaver-like rodent), *Pliomys episcopalis* (vole), *Mimomys savini* (water vole), *Pitymys arvaloides* and *gregaloides* (pine voles), *Ursus deningeri* (extinct medium-sized bear), *Stephanorhinus hundsheimensis* (extinct rhinoceros) and various species of: water shrew, large shrew, small horse, marten, mustelid, elk, bison, otter, small cat, jaguar-sized cat, sabre-toothed cat and two species of giant deer.	Russian desman Barbary macaque Common hamster Northern vole Wolf Spotted hyaena Common vole Wild boar *(was present until hunted to extinction in the 17^{th} Century)* Beaver *(became extinct in the 12^{th} Century)*	hedgehog common mole hare bank vole wood mouse weasel stoat polecat pine marten wildcat noctule bat pygmy shrew red deer roe deer horse *(re-introduced by man)*

Other flora and fauna found in the West Runton Forest Bed

Frogs, toads and other amphibians, grass snakes, freshwater snails, waterfowl, and various freshwater fish. A lot of wood was found (mostly alder), and also macroflora and pollen suggesting a climate very similar to today.

Frequently Asked Questions:

How do we know it was a "he"?

Because of the size and shape of the hip bones. Female elephants have a different shaped pelvis for giving birth to young elephants.

How tall was he?

About four metres high at the shoulder, much taller than modern elephants.

How much did he weigh?

About ten tons, twice the weight of a male African elephant.

How old are the fossils?

About 600,000 – 700,000 years old.

How old was the elephant when he died?

We know from the wear on his teeth that he was "in his prime" – in his forties, and would normally have lived to his sixties.

Was it a mammoth or an elephant?

Technically he is a very early mammoth, which is a type of elephantid. It was the descendants of this species that became what we call the "woolly mammoths" that lived in the colder conditions of the ice ages and were a lot smaller.

How did the West Runton Elephant get to England, did he have to swim?

No, Britain was attached to the continent at that time.

What animals hunted the elephant?

None, they are far too big to be hunted - except by humans (but we have no evidence of humans from the Freshwater Bed).

What other animals were around at the time?

Spotted hyaenas, giant beaver, extinct big cats, extinct species of rhino, extinct giant deer and

and other deer.

Why don't we have elephants in England now?

Because of a combination of things: Successive ice ages stressed our native animals to such an extent that many became extinct naturally. But hunting by early humans may also account for their demise. After the last ice age sea levels rose, creating the North Sea which then prevented land animals from re-colonising Britain.

What did he eat?

Grass, herbaceous shrubs and other vegetation in an open forest and grassland environment.

Back then was it colder or warmer than today?

We know from the small mammals and the pollen from the plants that at the time the West Runton Elephant lived the climate was exactly the same as today. Although the list of animals living with the elephant sounds exotic, this is because we have lost these species due to hunting and the effects of the relatively recent ice ages, not because the climate was any different back then.

What can we see on display?

There is currently a small exhibition on the elephant project at Cromer Museum, and the lower jaw of the elephant is on display at the Castle Museum, Norwich. There is an informal display of text and pictures at the Beach Café at West Runton itself. There will be a major, permanent, exhibition of the West Runton Elephant remains and local geology in general in one of the Norfolk Museums in the future, but it is still a few years away.

Suggestions for Further Reading:

'The West Runton Elephant', Norfolk Museums Service **poster**, 1993.

'The West Runton Elephant Discovery and Excavation', Norfolk Museums Service **booklet**, 1997.

(The two items above and are available from all the Norfolk Museum shops)

'The West Runton Elephant', Ashwin T and Stuart A J, September 1996, Current Archaeology 149, 164-168.

'Pleistocene Environments in the British Isles', Jones R L and Keen D H, 1993, Chapman and Hall.

'Mammoths', Lister A M and Bahn P, 1995, MacMillan.

'Pleistocene Vertebrates in the British Isles', Stuart A J, 1982, Longman.

'Life in the Ice Age', Stuart A J, 1988, Shire Publications.

'The Ice Age in East Anglia', Stuart A J, 1989, NMAS information sheet.

'On the Track of Ice Age Mammals', Sutcliffe A J, 1986, British Museum (Natural History).

Acknowledgements

The West Runton Elephant Excavation and Conservation Projects were financed mostly by the Heritage Lottery Fund, Norfolk Museums and Archaeology Service, the MGC PRISM Fund, and Anglian Water.

On sale in the Museum shop are:

The West Runton Elephant Discovery and Excavation booklet £4.50

The West Runton Elephant poster £2.00

The West Runton Elephant postcard 35p

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